

(19) World Intellectual Property Organization  
International Bureau(43) International Publication Date  
2 May 2002 (02.05.2002)

PCT

(10) International Publication Number  
WO 02/35865 A1

(51) International Patent Classification<sup>7</sup>: H04Q 7/22, H04L 12/56

(21) International Application Number: PCT/GB01/04741

(22) International Filing Date: 26 October 2001 (26.10.2001)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data: 0026191.7 26 October 2000 (26.10.2000) GB

(71) Applicant (for all designated States except US): BIOMOTIX LIMITED [GB/GB]; Enterprise House, Vision Park, Histon, Cambridge CB4 9ZR (GB).

(72) Inventor; and

(75) Inventor/Applicant (for US only): BEART, Pilgrim [GB/GB]; Russell House, Chippenham Park, Chippenham, Ely CB7 5PT (GB).

(74) Agent: HARRISON GODDARD FOOTE; Belgrave Hall, Belgrave Street, Leeds LS2 8DD (GB).

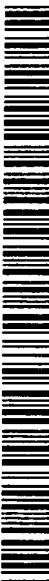
(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Published:**

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.



A1

(54) Title: COMMUNICATIONS APPARATUS AND METHOD

WO 02/35865 (57) Abstract: An electronic communications device adapted to be wirelessly linked to other electronic communications devices and a method of communicating between the electronic communications devices, the electronic communications devices each having a distinct identity and being individually locatable by a network or identifiable by each other when in relative proximity, wherein the electronic communications device is adapted to access a memory in which is stored data relating to the identities of at least a predetermined number of the other electronic communications devices and to provide an indication, when certain rules are fulfilled, when one or more of the other electronic communications devices is in a location within a predetermined distance of a location of the electronic communications device. The rule may be that the one or more other electronic communications devices have been identified more than a predetermined number of times. In this way, a user of such an electronic communications device can build up a list of identities of other electronic communications devices operated by various friends, colleagues and associates and the receive an indication when one or more of the friends, colleagues and associates is nearby.

## COMMUNICATIONS APPARATUS AND METHOD

The present invention relates to an apparatus and method for indicating the local presence of a communications device, such as a mobile telephone or personal digital assistant (PDA) or the like, belonging to a predetermined person or persons selected from a predetermined group of persons, the selection of the person or persons being managed automatically.

Location-based communications services are becoming more prevalent in connection with various devices, most notably mobile telephones, where a mobile telephone network is able to locate a given mobile telephone to within a predetermined degree of accuracy, possibly a few metres. Furthermore, modern electronic communications devices, including mobile telephones, are now equipped with non-network communications protocols, such as Bluetooth® or similar, whereby the communications device is able to determine the local presence of other electronic communications devices.

While this ability to locate an electronic communications device has many advantages, there remains a need for managing privacy. For example, although users of such a device may be happy for their friends to know where they are, they may be less willing for this location information to be available to unknown third parties or the like. Furthermore, if a user is in the same locality as a close friend having a similar electronic communications device, they may both wish the electronic communications devices to indicate their proximity so that the user and his or her friend can meet. However, the user may not wish his or her presence to be indicated to another user who is not such a good friend.

It is apparent that there is a growing need to manage "levels" or "shells" of privacy, for example to indicate whether certain people fall into the class of "good friend" or "trusted associate" or whether they are classified as people to whom the user does not want his or her presence to be indicated. This information could be updated

manually by the user, but this is cumbersome and the information is likely always to be out of date. An example of a method and system in which a user of a mobile communication unit (such as a mobile telephone) is alerted to the proximity of another user of a similar mobile communication unit, based on predetermined user-selected parameters, is described in WO 00/22860. However, because this method and system relies entirely on each user manually maintaining a contact or "buddy" list, including the user-selected parameters, it is relatively cumbersome to keep the contact list updated, especially in today's social and business environments where a person will come into contact with possibly hundreds of colleagues and co-workers 10 in a single day.

According to a first aspect of the present invention, there is provided an electronic communications device adapted to be wirelessly linked to other electronic communications devices, the electronic communications devices each having a 15 distinct identity and being individually locatable and identifiable by a network or identifiable by each other when in relative proximity, wherein the electronic communications device is adapted to access a memory adapted to store identity data relating to at least a predetermined number of the other electronic communications devices and to provide an indication of the identity of one or more of the other 20 electronic communications devices determined to be within a predetermined distance of the electronic communications device, but only when:

- a) the one or more of the other electronic communications devices has been identified and determined to be in a location within a predetermined distance of a 25 location of the electronic communications device more than a predetermined number of times, this being a first order relationship; or
- b) the one or more of the other electronic communications devices is determined to have been identified and determined to have been in a location within a predetermined distance of an electronic communications device previously identified and determined to be within a predetermined distance of the electronic 30

communications device more than a predetermined number of times as defined in a) above, this being a second order relationship; or

5 c) the one or more of the other electronic communications devices is determined to have an  $n$ th order relationship with the electronic communications device, extrapolating from b) above.

According to a second aspect of the present invention, there is provided a method of identifying a uniquely-identifiable electronic communications device to another 10 uniquely-identifiable electronic communications device, the electronic communications devices each having a distinct identity and being individually locatable and identifiable by a network or identifiable by each other when in relative proximity, wherein the electronic communications device accesses a memory adapted to store identity data relating to at least a predetermined number of the other 15 electronic communications devices and provides an indication of the identity of one or more of the other electronic communications devices determined to be within a predetermined distance of the electronic communications device, but only when:

20 a) the one or more of the other electronic communications devices has been identified and determined to be in a location within a predetermined distance of a location of the electronic communications device more than a predetermined number of times, this being a first order relationship; or

25 b) the one or more of the other electronic communications devices is determined to have been identified and determined to have been in a location within a predetermined distance of an electronic communications device previously identified and determined to be within the predetermined distance of the electronic communications device more than a predetermined number of times as defined in a) above, this being a second order relationship; or

c) the one or more of the other electronic communications devices is determined to have an  $n$ th order relationship with the electronic communications device, extrapolating from b) above.

5 According to a third aspect of the present invention, there is provided an electronic communications device adapted to be wirelessly linked to other electronic communications devices, the electronic communications devices each having a distinct identity and being individually locatable and identifiable by a network or identifiable by each other when in relative proximity, wherein the electronic  
10 communications device is adapted automatically to build up a list in a memory of data relating to the identities of one or more of the other electronic communications devices which are determined to have been located within a predetermined distance of the electronic communications device at least a predetermined number of times, and to provide an indication when any of the one or more other electronic  
15 communications devices whose identity data have been stored in the memory is subsequently determined to be within a predetermined distance of the electronic communications device.

According to a fourth aspect of the present invention, there is provided a method of  
20 identifying a uniquely-identifiable electronic communications device to another uniquely-identifiable electronic communications device, the electronic communications devices each having a distinct identity and being individually locatable and identifiable by a network or identifiable by each other when in relative proximity, wherein the electronic communications device automatically builds up a  
25 list in a memory of data relating to the identities of one or more of the other electronic communications devices which are determined to have been located within a predetermined distance of the electronic communications device at least a predetermined number of times, and provides an indication when any of the one or more other electronic communications devices whose identity data have been stored  
30 in the memory is subsequently determined to be within a predetermined distance of the electronic communications device.

The predetermined distance may be 5m, 10m, 20m, 30m, 50m, 100m or more, depending on the nature of the electronic communications devices. In some embodiments, the predetermined distance may be defined as a maximum dimension 5 of a room or building within which the electronic communications devices may be temporarily located.

An indication may be provided when the other electronic communications device is one which has been identified by the electronic communications device more than a 10 predetermined number of times. In other words, the electronic communications device may only provide an indication of the proximity of one of the other electronic communications devices when that other electronic communications device has been previously identified to be proximate to the electronic communications device on more than a predetermined number of occasions. The number of times or occasions 15 may be chosen appropriately by a user, and may be at least one, two, three, four, five, ten, twenty, fifty or any other number. In this way, an electronic communications device can build up a list of other electronic communications devices carried by other people with whom a person carrying the device is regularly in contact, such as friends or work colleagues. In a preferred embodiment, the presence of the electronic 20 communications device is reciprocally indicated by the other electronic communications device, although it may be advantageous for this feature to be selectively operable. In this way, a user of an electronic communications device can be alerted to the presence of "friendly" associates who are carrying similarly-configured electronic communications devices.

25

The present invention can be thought of as providing a variation of a technique used by World-Wide Web search engines to identify and rank websites in order of likely importance and relevance by defining the importance of a website by the number of other websites to which it is linked to or by which are also defined as "important". 30 Although this definition of importance is somewhat circular, it is nevertheless a useful and powerful concept.

Preferably, the electronic communications device is adapted to allow a user to select which of the other electronic communications devices are identified to the user when in proximity thereto. For example, the presence of one of the other electronic 5 communications devices may be indicated on a display, the display further providing identification information regarding a user of the other device. The user of the electronic communications device may then make a choice as to whether he wishes to be identified to the user of the other device, and if so, may press a key on his device or suchlike so as to set the identity of the other device in the memory with a flag 10 indicating that the other device is one which is to be identified in future.

The memory to which the electronic communications device has access may be an on-board memory located on or in the electronic communications device, or may alternatively be a remote memory with which the electronic communications device 15 communicates, possibly by way of a wireless network or by direct wireless communication such as Bluetooth® or the like.

Where the memory is an on-board memory, it is to be appreciated that the memory will not contain identity details of any other individual electronic communications 20 devices until the electronic communications device in question is first used. Upon first use, the device will start to build up a list of identity details relating to other devices which are determined by the device itself or by the network to which it is linked to be within the predetermined distance of its location. The identity details of the other devices may be transmitted directly from the other devices, for example as 25 part of a repeatedly and automatically transmitted individual identity signal (which may be disabled by a user for privacy purposes), or may be delivered by way of the network (but preferably only when users of the other devices have positively selected automatic identification of their devices to others as an option from the network operator).

Alternatively, the memory may be a central memory or database or the like maintained by a network operator and to which the electronic communications device has access by way of the network. In this case, the central database may already contain details relating to each and every electronic communications device which 5 has ever used the network, for example by way of a user registration process or automatically any time a device communicates by way of the network. This central database may allow many more identity details to be stored than an on-board memory, and may have superior searching facilities due to improved processing capability.

10

In a particularly preferred embodiment, there may be a combination of an on-board memory and a central database, with the on-board memory storing the identities of other devices which have already been determined to have been in proximity to the user's device more than a predetermined number of times, and the central database 15 storing the identities of every device using the network and which the user's device has not yet identified to be in close proximity more than a predetermined number of times. This combination enables rapid processing of previously identified other devices without the need for a list of the identities of all possible other devices to be stored in the on-board memory.

20

It is to be appreciated that embodiments of the present invention provide a significant advantage over the system disclosed in WO 00/22860, which provides an electronic communications device adapted to indicate the proximity of other electronic communications devices, but only when the identities of the other electronic 25 communications devices have been manually determined by a user and stored in a memory of the electronic communications device. By building up a memory list automatically on the basis of previous interactions with other electronic communications devices, the electronic communications device of embodiments of the present invention obviates the onerous requirement to update the memory list 30 manually, thereby helping to keep the list up-to-date.

In a particularly preferred embodiment, the memory to which the electronic communications device has access and in which the identities of the other electronic communications devices and their associated users are stored may organise the identity data in a number of "shells" or subsets. For example, there may be different 5 identity categories for personal friends, work colleagues, business associates and so forth. These "shells" or subsets may be constructed largely automatically, again based on location and time. For example, a given electronic communications device can automatically make users of other electronic communications devices members 10 of "shells" or subsets such as "WORK" or "HOME" simply by detecting an unusual clustering of frequency time-and-space presences. The electronic communications device can then be operated by the user thereof so as to know that a given location is called "HOME", and another given location is called "WORK", for example, thus providing for an easy human-machine interface.

15 This concept may be extended to second and subsequent orders, in that if the electronic communications devices share data stored in their automatically-or-manually-determined "shells" or subsets (possibly via a communications network) then it is possible to define a selectable rule that members of the "shells" or subsets of a second electronic communications device can be made members of the "shells" 20 or subsets of a first electronic communications device which includes the second electronic communications device in one of its own "shells" or subsets. It would then be possible for a user to sit in a room, for example, and to operate his or her electronic communications device to locate someone nearby carrying another electronic communications device and with whom he or she has a direct or indirect 25 (location-based) relationship. The electronic communications device may be operable to explain the connection by displaying how the various members of the "shells" or subsets are linked, e.g. "Person A is present. He used often to be at "WORK" with Person B, who is often at "WORK" with you now".

30 The user of the electronic communications device may selectively activate each of these "shells" or subsets depending on his personal circumstances. For example, the

user may be happy to identify and be identified by his work colleagues and business associates during working hours, but may prefer that only his personal friends are identified during the evenings and at weekends.

5 It is also possible to associate the memory with an electronic diary such as that provided by Microsoft® as part of its Outlook® software package. When entering details of future meetings and appointments, data identifying electronic communications devices carried by people who the user is to meet can also be entered. In this way, it is possible for the electronic communications device to  
10 indicate the proximity of another electronic communications device carried by a person with whom the user will be spending time in future. So, for example, the device may indicate that a person who the user will be meeting in two weeks' time at a conference is actually sitting in the same restaurant as the user before the meeting actually takes place.

15

The electronic communications device may be a mobile telephone, personal digital assistant, electronic pager, portable computer or other suchlike device. The electronic communications device may be adapted to be wirelessly linked to a network of other electronic communications devices and/or may be adapted to be  
20 wirelessly linked directly to other electronic communications devices, for example by way of the Bluetooth® peer-to-peer communications protocol.

25

It will be appreciated that any processing carried out to identify the other electronic communications devices and to determine how many times, if at all, they have previously been determined to be proximate to the electronic communications device, as well as other matching or sorting algorithms and processes, may be carried out in the electronic communications device itself by way of an electronic processing unit, or remotely by a processor or server at a central location to which the electronic communications device has access by way of a network.

CLAIMS:

1. An electronic communications device adapted to be wirelessly linked to other electronic communications devices, the electronic communications devices each having a distinct identity and being individually locatable and identifiable by a network or identifiable by each other when in relative proximity, wherein the electronic communications device is adapted to access a memory adapted to store identity data relating to at least a predetermined number of the other electronic communications devices and to provide an indication of the identity of one or more of the other electronic communications devices determined to be within a predetermined distance of the electronic communications device, but only when:
  - a) the one or more of the other electronic communications devices has been identified and determined to be in a location within a predetermined distance of a location of the electronic communications device more than a predetermined number of times, this being a first order relationship; or
  - b) the one or more of the other electronic communications devices is determined to have been identified and determined to have been in a location within a predetermined distance of an electronic communications device previously identified and determined to be within a predetermined distance of the electronic communications device more than a predetermined number of times as defined in a) above, this being a second order relationship; or
- 25 c) the one or more of the other electronic communications devices is determined to have an *n*th order relationship with the electronic communications device, extrapolating from b) above.

- 30 2. An electronic communications device adapted to be wirelessly linked to other electronic communications devices, the electronic communications devices each having a distinct identity and being individually locatable and identifiable by a

network or identifiable by each other when in relative proximity, wherein the electronic communications device is adapted automatically to build up a list in a memory of data relating to the identities of one or more of the other electronic communications devices which are determined to have been located within a predetermined distance of the electronic communications device at least a predetermined number of times, and to provide an indication when any of the one or more other electronic communications devices whose identity data have been stored in the memory is subsequently determined to be within a predetermined distance of the electronic communications device.

10

3. A device as claimed in claim 1 or 2, adapted such that the predetermined number of times is at least one.

15

4. A device as claimed in claim 1 or 2, adapted such that the predetermined number of occasions is at least five.

5. A device as claimed in any preceding claim, adapted to allow a user to select which of the other electronic communications devices are identified and their presence indicated when in proximity thereto.

20

6. A device as claimed in any preceding claim, wherein the memory is subdivided into a plurality of subsets, each distinct subset containing data relating to the identities of a distinct group of one or more of the other electronic communications devices.

25

7. A device as claimed in claim 6, wherein the identities of the other electronic communications devices are automatically allocated to predetermined subsets depending on a location and/or time of previous identification.

30 8. A device as claimed in any preceding claim, wherein the memory is located on or in the electronic communications device.

9. A device as claimed in any one of claims 1 to 7, wherein the memory is a central memory at a location remote from the electronic communications device and accessible by way of a network.

5 10. A method of identifying a uniquely-identifiable electronic communications device to another uniquely-identifiable electronic communications device, the electronic communications devices each having a distinct identity and being individually locatable and identifiable by a network or identifiable by each other when in relative proximity, wherein the electronic communications device accesses a  
10 memory adapted to store identity data relating to at least a predetermined number of the other electronic communications devices and provides an indication of the identity of one or more of the other electronic communications devices determined to be within a predetermined distance of the electronic communications device, but only when:

15

a) the one or more of the other electronic communications devices has been identified and determined to be in a location within a predetermined distance of a location of the electronic communications device more than a predetermined number of times, this being a first order relationship; or

20

b) the one or more of the other electronic communications devices is determined to have been identified and determined to have been in a location within a predetermined distance of an electronic communications device previously identified and determined to be within the predetermined distance of the electronic  
25 communications device more than a predetermined number of times as defined in a) above, this being a second order relationship; or

c) the one or more of the other electronic communications devices is determined to have an *n*th order relationship with the electronic communications device,  
30 extrapolating from b) above.

11. A method of identifying a uniquely-identifiable electronic communications device to another uniquely-identifiable electronic communications device, the electronic communications devices each having a distinct identity and being individually locatable and identifiable by a network or identifiable by each other when in relative proximity, wherein the electronic communications device automatically builds up a list in a memory of data relating to the identities of one or more of the other electronic communications devices which are determined to have been located within a predetermined distance of the electronic communications device at least a predetermined number of times, and provides an indication when any of the one or more other electronic communications devices whose identity data have been stored in the memory is subsequently determined to be within a predetermined distance of the electronic communications device.

10

12. A method according to claim 10 or 11, wherein the predetermined number of times is at least one.

15

13. A method according to claim 10 or 11, wherein the predetermined number of times is at least five.

20

14. A method according to any one of claims 10 to 13, wherein a user may select which of the other electronic communications devices are identified and their presence indicated when in proximity thereto.

25

15. A method according to any one of claims 10 to 14, wherein the memory is subdivided into a plurality of subsets, each distinct subset containing data relating to the identities of a distinct group of one or more of the other electronic communications devices.

30

16. A method according to claim 15, wherein the identities of the other electronic communications devices are automatically allocated to predetermined subsets depending on a location and/or time of previous identification.

## INTERNATIONAL SEARCH REPORT

1 \_\_\_\_\_  
 PCT/GB 01/04741

A. CLASSIFICATION OF SUBJECT MATTER  
 IPC 7 H04Q7/22 H04L12/56

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
 IPC 7 H04Q H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, INSPEC

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 99 17566 A (TODD TERENCE DOUGLAS ; CLARKE DAVID JULIAN (GB); LEASK DAVID MATTHE) 8 April 1999 (1999-04-08) page 3, line 11 -page 5, line 29 page 11, line 25 -page 12, line 5 page 20, line 13 - line 33 figures 1,3 ----	1-16
Y	US 5 987 011 A (TOH CHAI KEONG) 16 November 1999 (1999-11-16) column 3, line 31 - line 65 column 16, line 8 - line 54 ----	1-16 -/-

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

## \* Special categories of cited documents

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the International filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \*&\* document member of the same patent family

Date of the actual completion of the international search

27 February 2002

Date of mailing of the international search report

06/03/2002

Name and mailing address of the ISA  
 European Patent Office, P.B. 5018 Patentlaan 2  
 NL - 2280 HV Rijswijk  
 Tel (+31-70) 340-2040, Tx 31 651 epo nl.  
 Fax (+31-70) 340-3016

Authorized officer

Rabe, M

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 01/04741

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 00 22860 A (DEGNBOL JANUS FRIIS) 20 April 2000 (2000-04-20) cited in the application page 3, line 3 -page 5, line 20 page 6, line 1 - line 17 page 9, line 32 -page 10, line 23 figure 1 ---	1-16
A	EP 0 561 129 A (R TECHNOLOGIES LTD B V) 22 September 1993 (1993-09-22) abstract column 3, line 1 - line 35 figure 1 ---	1,2,10, 11
A	HAARTSEN J: "BLUETOOTH - THE UNIVERSAL RADIO INTERFACE FOR AD HOC, WIRELESS CONNECTIVITY" ON - ERICSSON REVIEW, ERICSSON, STOCKHOLM, SE, no. 3, 1998, pages 110-117, XP000783249 ISSN: 0014-0171 the whole document -----	1,2,10, 11

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 01/04741

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
WO 9917566	A	08-04-1999	AU EP WO	9274298 A 1021894 A2 9917566 A2		23-04-1999 26-07-2000 08-04-1999
US 5987011	A	16-11-1999		NONE		
WO 0022860	A	20-04-2000	AU WO EP	6188299 A 0022860 A1 1151627 A1		01-05-2000 20-04-2000 07-11-2001
EP 0561129	A	22-09-1993	IL DE DE EP US	100804 A 69326270 D1 69326270 T2 0561129 A2 5396644 A		31-01-1996 14-10-1999 18-05-2000 22-09-1993 07-03-1995